630.72
O662ec
#675

Diseases and Insect Pests of STONE FRUITS in Oregon

UNIVERSITY OF ARIZONA
Jan 14 '63
LIBRARY

Federal Cooperative Extension Service • Oregon State College • Corvallis

Cooperative Extension work in Agriculture and Home Economics, F. E. Price, director, Oregon State College and the United States Department of Agriculture cooperating. Printed and distributed in furtherance of Acts of Congress of May 8 and June 30, 1914.

Extension Circular 675 **February 1961**

Prepared by the
Federal Cooperative Extension Service
in cooperation with the
Departments of Plant Pathology,
Entomology, and Agricultural Chemistry

**This is revised from and is to supersede EC 665,
an earlier edition of the same title.**

Diseases and Insect Pests of Stone Fruits in Oregon

Peaches, cherries, prunes, plums, and apricots are among the more important commercial and garden fruit crops in Oregon. The control of diseases and insect pests of both the trees and the fruits is essential for profitable production. This publication contains recommendations for controlling the more serious diseases and insect pests attacking stone fruits. The recommendations in this circular are for the commercial fruit grower. Home owners with a few fruit trees will find Extension Circular 631, Spray Schedule for Home Orchards, more suitable for their needs.

In the Medford, Hood River, The Dalles, Milton-Freewater, and La Grande fruit growing districts, local spray recommendations are made to meet conditions peculiar to those areas. Growers in these districts should consult their local County Extension Agents for plant disease and insect control recommendations.

Bees Are Necessary — Don't Kill Them

Bees are essential for fruit set, particularly in prunes and cherries. Every effort should be made to protect these pollinating insects in orchards. The following suggestions are made to give maximum protection to bees.

1. Avoid using insecticides during the bloom period.
2. Do not introduce bees into the orchard until there is 10% bloom.
3. If for some reason insecticides are needed during the bloom period applications should be made in the evening after bee activity ceases.
4. Have the beekeeper move bees from the orchard as soon as the peak of the blooming period is passed.
5. Competing bloom, such as mustard in the orchard cover, is usually more attractive to honeybees than fruit blossoms. Insecticide residues settling on these cover crops are frequently the cause of heavy bee loss. From the standpoint of bee protection and increased pollination, it is desirable to mow competing bloom before the period of fruit pollination.

Spray Chemicals Kill People Too!

Many of the materials mentioned in this bulletin, such as DNOC, ALDRIN, DIELDRIN, ENDRIN, NICOTINE SULFATE, TAG AND PURATIZED AGRICULTURAL SPRAY, are dangerous poisons and all require careful handling, but the organic phosphorus insecticides - DEMETON (SYSTOX), EPN, PARATHION, PHOSDRIN, SCHRADAN (SYTAM), TEPP, and THIMET, - are extremely poisonous and require a special warning.

Watch for These Symptoms

The pesticides mentioned above easily enter the body through contact with the skin as well as through the mouth and throat and through breathing. Repeated exposures to these compounds may, even without symptoms, increase susceptibility to poisoning. The initial symptoms of organic phosphorus poisoning are giddiness, headache, nausea, vomiting, excessive sweating, and tightness of the chest. These are followed by or accompanied by blurring of vision, diarrhea, excessive salivation, watering of the eyes, twitching of muscles, especially in the eyelids, and mental confusion. One of the most characteristic signs is constriction of the pupils but this may be preceded by dilation. Late signs are fluid in the chest, convulsions, coma, loss of urinary or bowel control, and respiratory failure.

Poisoning by the chlorinated hydrocarbon insecticides primarily affects the nervous system and symptoms may include hyperexcitability, tremors, and convulsions. General symptoms are malaise, headache, fatigue, and possible lack of appetite and weight loss.

What to Do for Poisoning

1. In severe cases of organic phosphorus poisoning, breathing may stop. In such a situation artificial respiration is the most important first aid until breathing has resumed.

2. Get the patient to a hospital or physician as soon as possible. Give artificial respiration on the way if the patient turns blue or stops breathing. Take along a label for the doctor's information.

3. Never try to give anything by mouth to an unconscious patient.

4. INTERNAL--If the insecticide has been swallowed and vomiting has not resulted, induce vomiting by giving a strong soap solution or a tablespoon of salt dissolved in one-half glass of warm water.

5. SKIN--Where the insecticide has come into contact with the skin, immediately remove all clothing and bathe the patient with generous amounts of soap and water, rinsing thoroughly.

6. EYES--If spray gets in the eyes, wash them immediately with flowing water.

7. The patient should be made to lie down and should be kept warm.

Take These Precautions

CLOTHING--Wear protective waterproof clothing while spraying hazardous materials. Change and launder clothing and bathe daily.

MASK--When loading or mixing wettable powders or when applying dusts wear a respirator approved for the material in question by the U.S. Department of Agriculture.

GENERAL

1. Before using organic phosphorus insecticides, notify your physician. He will be better able to take care of a sudden illness if he is told of probable spraying dates and other details. He may wish you to have a supply of 1/100 gr. atropine tablets for use in an emergency. This drug should never be used before exposure to organic phosphorus insecticides, for it may hide important warning symptoms. Use one or two tablets only after definite symptoms occur. Never take atropine without calling your physician at once. Any person who is ill enough to receive a single dose of atropine should remain under medical observation for 24 hours, because the atropine may produce only a temporary relief of symptoms in what may prove to be a serious case of poisoning.

2. NEVER MEASURE OR LEAVE MIXTURES OF INSECTICIDES IN BEVERAGE BOTTLES OR IN LABELED CANS OR BOXES WHICH HAVE FORMERLY CONTAINED FOOD PRODUCTS. BURN OR BURY EMPTY INSECTICIDE BAGS OR OTHER CONTAINERS. (EACH YEAR TRAGIC, PREVENTABLE POISONINGS OCCUR WHEN CHILDREN OBTAIN FOOD CONTAINERS FILLED WITH INSECTICIDE OR GET HOLD OF "EMPTY" INSECTICIDE CONTAINERS.)

3. Do not eat, smoke, or chew while mixing or applying hazardous insecticides.

4. Mix these insecticides according to directions and apply at the recommended rate.

5. Experience indicates that poisoning occurs most often in hot weather. Spraying should be done during cooler periods (such as at night) insofar as possible and extra care taken when it is necessary to spray during periods of high temperature.

6. Apple thinners and others have been poisoned by working in orchards treated with parathion less than 48 hours before. Therefore, it is advisable to wait longer than 48 hours before beginning work in treated orchards. If possible, wait a week.

7. Bury spilled insecticide and wash contaminated parts of the body with soap and copious amounts of water. The breakdown of these insecticides can be speeded up by using a weak lye solution.

8. Cover crops treated with organic phosphorus insecticides should not be used as pasture until two weeks after treatment. Cattle should not be fed forage crops treated with dieldrin or endrin.

This warning statement was prepared with the assistance of staff members of the Wenatchee, Washington Field Station of the Communicable Disease Center, Public Health Service, U. S. Department of Health, Education, and Welfare.

In Case of Emergency

See your doctor at once. Your doctor may call the Oregon Poison Control Registry, in Portland, Oregon. Daytime: CA 8-9181; Night (11 p.m. to 7 a.m.): CA 8-5546. This service maintains up-to-date files on all agricultural chemicals and other poisons. The service is available to professional persons only.

Residue Tolerances

In preparing these spray programs, full consideration has been given to residue tolerances established by the Federal Food and Drug Administration. The suggested minimum number of days between last application of a pesticide and harvest is based on the best information available. All tolerances are subject to change and unusual local conditions or spray practices may affect the persistence of residues.

Regulations exempt petroleum oils, sulfur, lime sulfur, and Bordeaux from requiring a tolerance since they are not classed as poisonous or deleterious substances.

Residue Tolerances on Stone Fruits

Pesticide	Parts per million of permissible residue				Minimum time between last application and harvest.
	Cherries	Prunes	Peaches	Apricots	Days
Bordeaux	Exempt				Exempt
Captan	100	100	100	100	0
Cyprex	5 (Sours only)	-	-	-	Sour cherry - 0 Sweet cherry - nonbearing trees only.
DDT	7	7	7	7	Cherries, prunes, peaches - 30 Apricots - 42
Demeton	N.R.*		0.75		Cherries - one application at pre-bloom or petal fall stage. Peaches - 30 days. Prunes, apricots - nonbearing trees only.
Diazinon	0.75	0.75	0.75	0.75	Cherries, prunes, apricots - 10 Peaches - 20
Ethion	N.R.	1	1	-	Cherries, dormant application only. Peaches - 30 Prunes - 45 On peaches and prunes do not make more than 2 applications during the fruiting period.
Ferbam	7	7	7	7	Apricots - 21 Cherries - 7 Peaches - 21 Prunes - 7
Kelthane	5	5	10	10	Cherries and prunes - 7 Peaches and apricots - 14

*No residue when used as directed.

Residue Tolerances on Stone Fruits (Continued)

Pesticide	Parts per million of permissible residue				Minimum time between last application and harvest
	Cherries	Prunes	Peaches	Apricots	
Kolo-100	3	3	3	N.R.	Days Cherries - 3 Peaches - 7 Prunes - 3
Lead Arsenate	7	7	7	7	30 except 14 if cherries for processing; except, 7 days in Willamette Valley for lead dust on cherries for processing, and 2 days for lead dust on cherries in The Dalles district only.
Malathion	8	8	8	8	Cherries and prunes - 3 Peaches and Apricots - 7
Maneb	-	-	10	7	Apricots - petal fall. Peaches - if applied within 14 days of harvest, remove residues by brushing. Cherries - petal fall.
Methoxychlor	14	14	14	14	Cherries and prunes - 7 Peaches and apricots - 21
Oil	-	-	-	-	Exempt
Parathion	1	1	1	1	14
Perthane	15	-	-	-	2 - cherries only
Phygon XL	3	3	3	N.R.	Apricots - no application after petal fall. Cherries - 3 Peaches - 7 Prunes - 3
Puratized Ag. Spray	N.R.	N.R.	N.R.	-	Not after petal fall.
Sevin	10	10	10	-	1 day - peaches, cherries, prunes.
Sulfur	Exempt				Exempt
TAG	N.R.	N.R.	N.R.	N.R.	Not after petal fall.
Trithion	0.8	0.8	0.8	0.8	30
Wettable Sulfur	Exempt				Exempt
Ziram	7	-	7	7	Apricots - early cover sprays. Cherries - 7 Peaches - early cover and before harvest (remove residue by wiping or brushing).

GUIDE FOR RATE OF APPLICATION WITH AIR CARRIER SPRAYERS

Dosages in the spray schedule refer to the amount of insecticides or fungicides to be mixed with 100 gallons of water, and as would be applied by the bulk method using hand spray guns.

The number of gallons of spray applied per acre with commonly used air carrier sprayers varies from 400 to 600, although some growers report success with considerably less gallonage per acre. The size of trees, amount of foliage, and other factors will be important in determining the amount of spray to use per acre. Experience with various types of equipment will enable growers to make efficient and economical modifications.

The following chart gives a suggested amount of each spray material required per acre when applied to mature trees.

Spray material		Amount per acre
Bordeaux 8-8-100	copper sulfate	32 lbs.
	lime	32 lbs.
Bordeaux 12-12-100	copper sulfate	48 lbs.
	lime	48 lbs.
Captan (50% wettable powder)		8 lbs.
Cyprex (65% wettable powder)		2 lbs.
DDT (50% wettable powder)		8 lbs.
Demeton (2 lbs. actual per gallon)		4 pints
Diazinon (25% wettable powder)		4 lbs.
Diazinon (2 lbs. actual per gallon)		4 pints
DN (liquid)		6 qts.
DN (wettable powder)		6 lbs.
Ferbam (76% wettable powder)		8 lbs.
Kolo-100		14 lbs.
Kelthane (18 1/2% wettable powder)		10 lbs.
Lime sulfur	combined in dormant	12 gals.
Dormant oil, actual	combined in dormant	8 gals.
Lime sulfur	combined in dormant	12 gals.
Volck Supreme oil spray	combined in dormant	6 gals.
Lead arsenate		12 lbs.
Malathion (25% wettable powder)		8 lbs.
Maneb (70% wettable powder)		8 lbs.
Methoxychlor (50% wettable powder)		8 lbs.
Oil alone, dormant, actual oil		16 gals.
Oil (Volck Supreme oil spray)		8 gals.
Parathion (25% wettable powder)		4 lbs.
Perthane (4 lbs. actual per gal.)		4 qts.
Phygon		2 lbs.
Puratized Ag. Spray	(peaches dormant)	12 pints
	(cherries dormant)	4 pints
	(peach and cherry blossom sprays)	4 pints
Sevin (50% wettable powder)		8 lbs.
Sulfur dust		50 lbs.

Spray material	Amount per acre
TAG (peach dormant)	6 pints
(peach and cherry blossom sprays)	2 pints
Trithion (25% wettable powder)	4 lbs.
Wettable Sulfur	24 lbs.
Ziram (76% wettable powder)	8 lbs.

Stone Fruit Diseases

Brown Rot

Brown rot (caused by the fungi Monilinia fructicola and M. laxa) causes both a blossom blight and a fruit rot in all stone fruits. During the 1957, 1958, and 1960 growing seasons the blossom blight phase of the disease was very destructive--up to 50% of the blossoms on many unsprayed cherry and peach trees became infected and were killed. The prevention of blossom blight requires the application of sprays at blossom time; the control of fruit rot requires spraying or dusting as the fruit approaches maturity. Observations and recent experimental work indicate that the amount of blossom blight directly influences the amount of brown rot fruit rot which occurs.

The fungus spores which originate the brown rot disease each spring may come from these sources:

1. Affected fruits which fell to the ground the previous year. These fruits are often called "mummies" because of their hard, dried-up condition. If they become covered with earth during the fall and winter, they may produce mushroom-like growths and liberate spores in the spring.

2. Affected fruits - "mummies" - which overwinter in the tree and produce spores in the spring.

3. The fruiting bodies in the wood that was killed by the blossom blight fungus the previous spring.

CONTROL OF BLOSSOM BLIGHT

Brown rot blossom blight in peaches, cherries, prunes, and apricots can be controlled best by spraying when the blossoms are showing pink through petal fall. At least three applications during the blossoming period (popcorn, full bloom, and petal fall stages of blossom development) are necessary. During wet blossom periods four or five fungicide applications may be required to give good control of blossom blight.

The fungus which causes blossom blight of cherry kills the blossoms and other flower parts. These often adhere to spurs and twigs until harvest time and can be a major source of fungus spores for the fruit rot phase of the disease.

On peach trees, the fungus after killing the blossoms penetrates the wood resulting in the death of young twigs and branches. By the following spring the fungus in the wood produces fruiting bodies containing spores which are probably the main

source of inoculum for peach blossom blight. Cutting out the twigs and branches killed by the fungus will aid in blossom blight control. The cutting should be done when the leaves are still on the tree and when the affected branches can be readily seen.

CONTROL OF BROWN ROT IN FRUIT

The severity of brown rot in ripening fruit varies from year to year depending on the season. During the green fruit stages no significant amount of brown rot is likely to appear unless there is considerable rainfall. As the fruit approaches the ripening period, the danger from brown rot becomes greater, especially if there is wet weather or high humidity. Much of the brown rot infection in ripening fruit originates in the orchard, but it may also spread rapidly in lugs or fresh fruit shipments after harvest if the fruit is held very long in storage or in transit. This is especially true in the case of prunes or peaches shipped fresh to distant markets.

The best known materials for the control of brown rot in the ripening of fruit are wettable sulfur, ferbam or ziram sprays, and sulfur dusts.1/ These are about equally effective, and the grower may use whichever he prefers or is equipped to use. If a sulfur dust is preferred, use 325-mesh or finer at the rate of 50 pounds per acre.

OTHER PRECAUTIONS RECOMMENDED

In addition to a well-planned and executed spray program, there are certain other practices which will help materially in reducing the amount of brown rot in peaches after picking. These practices are:

- Exercise the greatest care in picking and handling to avoid punctures and skin abrasions on the fruit. Any break in the skin of the fruit enables brown rot to gain entrance more easily. Discard all fruit with brown rot spots.

- Dust the lugs and packing boxes, both inside and out, when harvesting peaches, particularly in wet weather. When rains occur, the lugs should be dusted each time they are used. This precaution is important.

Coryneum Blight in Peaches and Apricots

This disease may cause serious damage to peach and apricot trees, particularly in Western Oregon. The blight is caused by the parasitic fungus Coryneum beijerinckii It blights the buds and produces small sunken spots on the fruiting wood during the fall and winter, followed by a severe spotting of the fruit, leaves, and twigs in the spring and early summer. Infected peach leaves are often partially shed throughout the early growing season. On 2- to 4-year-old wood, dark gnarled cankers develop. These act as holdover sources of spore infection. Because of the gummy material the canker produces, such infected areas may have a glazed or varnished appearance. In apricots, buds are blighted and often killed, but very few twig infections can be found.

1/ On apricots, sulfur has been found to have a detrimental effect when used in any form and is, therefore, not recommended on this fruit.

The most important control measure, consisting of a fall Bordeaux spray at 8-8-100, prevents bud and twig infections, many of which occur after fall and spring rains. In the spring, a sulfur spray or dust should be applied at the husk-fall stage to protect the young fruits from infection. On apricots use ziram instead of sulfur.

Peach Leaf Curl

This fungus organism attacks all varieties of peaches, injuring many of them critically. If unsprayed for a number of years, infected trees often die. Peach leaf curl, caused by the fungus Taphrina deformans, can be prevented by two applications of Bordeaux, Puratized Agricultural Spray, TAG, or lime sulfur if applied properly during the dormant season. Apply in mid-December and again in mid-January, before the buds swell in the spring.

Cherry Bacterial Canker (Dead Bud Phase)

The killing of dormant buds in cherry trees in the Willamette Valley, commonly known as the dead bud disease, is now known to be caused by the same bacterium that causes the bacterial canker disease of cherry. For this reason, dead bud will now be referred to as the dead bud phase of the bacterial canker disease.

Dead bud has been a serious problem in the Willamette Valley for many years and has resulted in the loss of many thousands of dollars. In recent years, the losses in some seasons have exceeded 30% of the expected Royal Anne cherry crop.

Dead bud is first noticed as dying buds on spurs in the spring. Infected buds usually start to die in February. As the disease progresses within the tree, both leaf and flower buds become infected. Dead bud usually starts in the lower cherry limbs and moves up into the tree and to adjacent trees in successive years. Often trees in the lower parts of the orchard where air drainage is poor are the first to become infected. If all the buds on a spur are killed, the spur will die back the following season. Cankers are seldom formed, but a slight gumming may be produced by the diseased buds. Repeated death of buds may result in misshapen growth, plant stems sometimes enlarging or flattening as if several were fused. In severe cases, 90% or more of the buds on a tree may be killed.

The varieties Royal Anne, Bing, Lambert, and Van are quite susceptible to dead bud. Black Republican and Mazzard seedlings are somewhat less susceptible.

Control of dead bud can be obtained by sprays of Puratized Agricultural Spray or Bordeaux 12-12-100. A reliable spreader-sticker should be added to the Puratized Agricultural Spray. Times of the spray applications are as follows:

(1) during October,
(2) as soon as possible after January 1.

Cherry Powdery Mildew

This fungus disease appears as a white mold on the surface of leaves and in very severe cases on the fruit. Often mildew is first noticed on the young shoots of trees in areas where there is poor air circulation because of location or tall cover crops. There has been no research in Oregon on the application of fungicides for the control of this disease. Where growers wish to apply fungicides the

recommendations of Washington State University may be used as a guide. Wettable sulfur at 4-6 pounds per 100 gallons of spray, or sulfur dust at 50 pounds per acre at shuck fall, and again 15-20 days later, are suggested.

Cherry Leaf Spot

This disease is caused by the parasitic fungus Coccomyces hiemalis. Sprays or dusts applied at petal fall, shuck fall, and again 2 weeks later control leaf spot. Captan, ferbam, Phygon XL, ziram, and Cyprex are recommended (do not use Cyprex on bearing sweet cherry trees). Thorough coverage of all foliage is necessary for cherry leaf spot control.

Insect Pests of Stone Fruits

Black Cherry Aphid

The black cherry aphid frequently causes severe injury to the terminal growth of sweet cherries. The leaves, particularly on the terminal growth, are curled and covered with a sticky honeydew. Overwintering eggs usually hatch in early March or about the time buds begin to swell.

Best control of black cherry aphid has been obtained with demeton (Systox) applied at prebloom or petal fall at the rate of 1 pint demeton emulsion concentrate containing 2 pounds actual demeton per gallon in 100 gallons water.

Dinitro sprays will destroy overwintering eggs of the black cherry aphid, but are not effective against aphids after they have hatched. To avoid injury dinitro sprays must be applied during the strictly dormant stage of bud development.

Dinitro compounds are available in both liquid and wettable powder forms. Use 1 1/2 quarts of the liquid or 1 1/2 pounds of the wettable powder in 100 gallons of water. The addition of dormant oil emulsion has improved the effectiveness of the dinitro wettable powder. Use 3 gallons of dormant oil emulsion plus 1 pound of dinitro wettable powder in 100 gallons of water.

Ethion-oil combinations at the rate of 1 to 2 gallons per 100 gallons of water applied in the dormant period have been effective.

Lime sulfur-oil combination sprays or oil sprays will aid in control of newly hatched aphids when applied in delayed dormant period. These sprays may cause injury if applied beyond the delayed dormant period.

Parathion at the rate of 1 pound of 25% wettable powder, or malathion at the rate of 2 pounds of 25% wettable powder to 100 gallons of water, will control both the bud moth and aphids. Diazinon at the rate of 1 pound 25% wettable powder to 100 gallons of water is effective in control of the black cherry aphid, but has not been tested against bud moth. These sprays should be applied during the popcorn stage of bud development. Parathion, malathion, and Diazinon will kill bees and should not be applied during the bloom period.

A 5% malathion dust also is effective against the black cherry aphid. It should be applied at the rate of approximately 50 pounds per acre and may be combined with sulfur for the control of brown rot. It is important that this dust be applied not

later than the popcorn stage. Nicotine sulfate, 1 pint in 100 gallons of water, may also be used for aphid control. If nicotine sulfate is used alone, add 2 to 3 pounds of laundry soap or 1 pound of casein spreader to each 100 gallons of spray. Nicotine sprays are not effective if applied when the temperature is below 70° F.

Bud Moth

These insects are found most frequently on prunes, but may damage all orchard fruits. They spend the winter as small, dark brown larvae and become active in the spring, about the time the buds begin to swell appreciably, burrowing into the expandin buds and terminal shoots. Later in the season a new generation feeds on the fruit and foliage, often attaching a leaf to the surface of the damaged fruit. A lead arsenate spray in the popcorn stage will control this insect. A spray of 1 pound of 25% wettable parathion or 2 pounds 25% wettable malathion in 100 gallons of water, or a 5% malathion dust at the rate of 40 to 50 pounds per acre, will control both bud moth and aphids.

Cherry Fruit Fly

The cherry fruit fly is the most serious insect pest of cherries. To be acceptable to buyers, cherries must be free of worms. This is possible if the recommended insecticides are thoroughly applied at the proper times.

Cherry fruit flies overwinter as pupae in small, hard, brown cases called puparia buried from 1 to 3 inches in the ground under infested cherry trees. The flies emerge from the soil, usually during the last week in May or first week in June. About 8 to 10 days after emergence, the female flies begin to lay eggs under the skin of the cherry. These eggs hatch in from 5 to 7 days and the maggots mature in about 14 to 20 days. When full grown, the maggots drop to the ground and form their puparia in the soil.

Insecticides are applied to kill the flies before they lay eggs. Therefore, it is important that they be applied soon after the flies emerge. Repeated applications of insecticides are necessary because the flies continue to emerge for 5 to 6 weeks. Flies will rest not only on cherry foliage, but on interplanted trees and shrubs along fence rows. These should be sprayed or dusted when applying insecticides to the cherries.

CHERRIES FOR PROCESSING

The decision whether to follow a spray or dust program will largely depend on the equipment available to the grower. Any of the following programs is satisfactory.

Dust Program

- Lead arsenate, 15%, 50 pounds per acre. Do not apply closer than 7 days before harvest in the Willamette Valley nor closer than 2 days before harvest in The Dalles district.

- Methoxychlor, 5%, 50 pounds per acre. Do not apply closer than 7 days before harvest.

- Malathion. If a dust application is necessary closer to harvest than 7 days to insure protection against fruit fly, a 5% malathion dust may be applied, but not closer than 3 days before harvest.

Spray Program

- Lead arsenate, 3 pounds per 100 gallons water. Do not apply closer than 14 days before harvest.

- Diazinon, 1 pound 25% wettable powder, or 1 pint emulsifiable concentrate containing 2 pounds Diazinon per gallon in 100 gallons water. Do not apply closer than 10 days before harvest. This insecticide also controls black cherry aphid.

- Methoxychlor, 2 pounds 50% wettable powder per 100 gallons of water. Do not apply closer than 7 days before harvest.

- Sevin, 2 pounds 50% wettable powder per 100 gallons of water. Do not apply closer than 1 day before harvest.

- Parathion, 1 pound 25% wettable powder, or 1 pint emulsifiable concentrate containing 2 pounds parathion per gallon in 100 gallons of water. Do not apply closer than 14 days before harvest. This material is very toxic to humans. Follow manufacturer's precautions carefully.

- Perthane, 1 quart emulsifiable concentrate containing 4 pounds Perthane per gallon in 100 gallons of water. Do not apply closer than 2 days before harvest.

- Lead arsenate bait spray, 5 pounds of lead arsenate plus 5 gallons of molasses in 100 gallons of water. Do not apply closer than 14 days before harvest. The bait spray is only recommended for the grower who has a small acreage or a few trees and may not have the equipment required to apply a complete cover spray.

Both spray or dust applications should be made at 10-day intervals beginning with the first emergence of the fly and continuing until harvest of the fruit. The date first flies emerge is variable. Usually it is in late May or early June, and is announced by County Extension Agents. Except for the bait spray, all sprays should be complete cover sprays and all parts of the tree should be thoroughly sprayed or dusted.

CHERRIES FOR FRESH MARKET

Cherries sold on the fresh market are not always washed. To avoid toxic and unsightly residues, recommendations differ from those for processed cherries. Any of the following programs is recommended.

Perthane, 1 quart Perthane emulsifiable concentrate containing 4 pounds actual Perthane per gallon in 100 gallons of water. Repeat application at 10-day intervals until harvest. Do not apply last spray within 2 days of harvest.

Methoxychlor - Parathion - Perthane, two pounds 50% methoxychlor wettable powder in water to make 100 gallons of spray. Follow in 10 days with Perthane, 1 quart emulsifiable concentrate containing 4 pounds actual Perthane per gallon; or parathion, 1 pint emulsifiable concentrate containing 2 pounds actual parathion

per gallon, in water to make 100 gallons of spray. Continue applications of parathion at 7-day intervals or Perthane at 10-day intervals, but do not apply parathion within 14 days of harvest or Perthane within 2 days of harvest.

NOTE: In some areas use of Perthane is often associated with an increase in spider mite populations. Growers who use Perthane may wish to substitute parathion for a Perthane application. The use of a miticide in a post harvest spray still may be necessary.

Diazinon, one pint Diazinon emulsifiable concentrate containing 2 pounds Diazinon per gallon in 100 gallons of water. Repeat applications at 10-day intervals until harvest. Do not apply within 10 days of harvest.

Regardless of the formula used, the sprays or dusts should be complete cover applications and all parts of the tree should be thoroughly sprayed or dusted.

Important Points to Remember

1. If air carrier sprayers are used the following amounts of insecticides per acre are suggested.

Diazinon (25% wettable powder)	4 pounds
Diazinon (E. C. 2 pounds actual per gal.)	4 pints
Lead arsenate	12 pounds
Methoxychlor (50% wettable powder)	8 pounds
Parathion (25% wettable powder)	4 pounds
Perthane (E. C. 4 pounds actual per gal.)	4 quarts
Sevin (50% wettable powder)	8 pounds

2. Regardless of the spray or dusts used or the program followed, the first application should be made when the first flies begin emerging. The date of beginning emergence will be announced by the Entomology Department, Oregon Experiment Station, through the Oregon State College Extension Service.

3. If any of the spray or dust applications for cherry fruit fly control are followed by heavy rains, they should be repeated.

4. Interplanted trees and foliage along fence rows should also be sprayed or dusted at the time the cherry trees are treated. While the cherry fruit flies deposit their eggs only in cherry fruits, they often rest on various types of foliage. Spraying or dusting foliage adjacent to cherry trees is important in obtaining good control of the cherry fruit fly.

5. Fungicides recommended by the Plant Pathology Department for brown rot on fruits may be added to insecticides used for the control of the cherry fruit fly.

Cherry Slug

This pest occurs as a greenish-brown, slimy, sluglike larva which skeletonizes the foliage of cherry. When the insect appears, dust with a lead arsenate-lime dust (20 pounds lead arsenate, 80 pounds hydrated lime), or spray with lead arsenate (2 1/2 pounds to 100 gallons water).

Green Peach Aphid

The green peach aphid is the most common species of aphid found on peaches. It overwinters as eggs on the buds, between the bud and the stem, or just beneath the bud. When first laid, the eggs are olive green, but within a few weeks turn black. The eggs begin hatching before the blossom period. The aphids damage blossoms and foliage. Aphids may be controlled by nicotine sulfate, 1 pint to 100 gallons of spray plus soap or casein spreader, or parathion, 1 pound of 25% wettable powder, or Diazinon, 2 pounds 25% wettable powder, or malathion, 2 pounds 25% wettable powder to 100 gallons of spray.

Lecanium Scale

Lecanium scale is more frequently a pest of peach and prune but may also be found on cherry. These insects overwinter on limbs and twigs of trees and appear as rather large, dark brown, strongly-humped scales. The standard method of control is to apply an oil emulsion spray (4% actual oil) in the early spring as the buds begin to swell. Injury may occur if oil sprays are used after buds start to open. The lime sulfur plus oil combination is also effective. Bordeaux mixture may be combined with dormant oil for both peach leaf curl and lecanium scale control.

Oriental Fruit Moth

The oriental fruit moth, a potentially serious orchard pest, was found in small numbers in a few localities in the vicinity of Portland and Salem in 1956. During 1957 and 1958 the number of moths collected by State Department of Agriculture entomologists in these areas increased, but in 1959 and 1960 the number decreased. The oriental fruit moth is primarily a pest of peaches and quince, but will infest cherries, apricots, apples, pears, plums, and other host plants.

The adult moth is grayish brown in color with a wing expanse of about half an inch. Larvae are pink in color and about half an inch long when full grown. The insect spends the winter as a full-grown larva inside a cocoon. Cocoons may be found under loose bark, bark crevices, mummified fruit, or hollow weed stems near the tree.

Moths usually begin emerging in April and reach a peak of emergence during the petal-fall stage of fruit development. Eggs are laid on the underside of foliage, usually near the terminal end of twigs. Larvae emerging from the eggs mine the young succulent twigs, causing the tips to wilt. Infested twigs die and procuce a condition known as "flagging."

Later in the summer, after twigs harden, larvae infest fruit. Five broods are probable per year. The first two broods infest twigs and the others attack fruit. In irrigated orchards where twig growth is succulent, larvae may infest twigs during the entire summer. Fruits on later maturing varieties are more susceptible to injury.

Applications of DDT and/or parathion at petal fall, a second application 10 to 12 days later and a third application about mid-June are suggested for control. DDT at the rate of 2 pounds 50% wettable powder or parathion at the rate of 1 pound 25% wettable powder per 100 gallons of water are suggested. DDT spray also is effective against the peach twig borer when applied at the petal-fall stage. Parathion will aid in the control of aphids, spider mites, and bud moth. Growers who do not have access to a sprayer for oriental fruit moth control may use a 10% DDT dust at a rate

of 40 pounds actual dust per acre. Do not apply DDT within 30 days of harvest or parathion within 14 days of harvest. Parathion is not recommended for use in residential areas.

Peach and Prune Root Borer

The peach and prune root borer can be a very serious pest on both peaches and prunes. The adult is a dark blue, clear-winged moth. The female sometimes has a bright orange band around the body. The larva does the damage. The presence of the insect is indicated by blobs of pitchy sawdust about the base of the tree.

This insect can be controlled by two applications of DDT. The first application is made about July 10 to 15, the second about 3 to 4 weeks later. Use DDT at the rate of 8 pounds of 50% wettable DDT to 100 gallons of spray. If the infestation is not heavy, usually the first DDT spray will give adequate control. Apply this insecticide as a coarse spray at 60 to 80 pounds pressure to the lower scaffold limbs and around the trunk. Allow some of the spray to puddle around the base of the tree. Trees 4 to 6 inches in diameter will require about 1 pint to 1 quart of spray per tree.

Fall application of paradichlorobenzene crystals or ethylene dichloride emulsion may also be used. See Oregon Agricultural Experiment Station Bulletin 513, "Control of Western Peach and Prune Tree Borer in Northeastern Oregon," for further details.

Peach-Twig Borer

This insect may attack peach, prune, and apricot. It hibernates over the winter in tiny chimney-like hibernaculae which the larvae construct in the crotches of peach branches and twigs. About the time the peaches begin blooming in the spring, the larvae become active and enter the developing twigs, killing them back 3 or 4 inches. One larva may attack several twigs. A second generation may cause serious injury to the fruit as well as twigs.

This insect can be controlled by spraying the peach trees when they are just past blooming, using 3 pounds of basic lead arsenate plus a spreader to 100 gallons of spray, or 2 pounds 50% wettable DDT powder to make 100 gallons of spray.

Pear Thrips

Pear thrips cause more damage to prunes than to pears or other fruits, but have caused localized damage to cherries. The slender, dark brown thrips emerge from the ground in the early spring, feed in the developing buds, and cause deformed leaves and blossom drop. If infestations are severe, they may be responsible for a complete crop failure.

In cases of severe infestation, two spray or dust applications of DDT are often necessary for effective thrips control. The first application is made when 30% to 50% of the buds show green tips. To determine whether a second spray or dust application is needed the orchardist should pick at least 300 buds at random from several trees.

Put the buds in a test tube or enclosed jar and place in a warm room. Examine the buds by picking them to pieces with needles. Count the thrips in the buds and in the container. If there are 90 or more thrips per 100 buds, a second application is necessary.

If only a few thrips can be found (25 to 50 thrips per 100 buds) and there is little evidence of injury at the time when 50% or more of the blossom buds show green, control applications may not be necessary.

San Jose Scale

San Jose scale has been one of the most serious orchard pests. It does most harm to apple and pear but may damage sweet cherry, peach, and prune. It spends the winter as half-grown, ash-gray or blackish, pimple-like scales on the bark. The bark usually shows a purple stain for a short distance around each scale, especially on young trees and new growth. Infested trees become devitalized and frequently have dead twigs. Infested fruit shows bright red spots. A dormant spray of lime sulfur or oil, or the combination of lime sulfur plus oil, is recommended for control. It is important that spraying be done thoroughly to cover all parts of the tree.

Shot-Hole Borers

Shot-hole borers most frequently attack trees that are in an unhealthy or sour-sap condition. The small, dark-colored beetles bore into the sapwood making tunnels where they lay their eggs. Small, round holes in the bark are characteristic of attack by these beetles. At times the point of attack is just beneath a bud or fruit spur that is weakened or killed. This type of injury often occurs along the margin of an orchard next to an old pile of prunings or another orchard which is heavily infested.

Damage by shot-hole borers largely can be prevented by keeping the orchard in a healthy, vigorous growing condition. Prunings should be destroyed promptly. A spray made with 2 pounds of 50% wettable DDT or 1 pound of 25% wettable parathion in 100 gallons of water aids in control. Shot-hole borers occasionally attack young trees. Under such situations where only a small amount of spray will be applied per tree, it is advisable to increase the dosage of DDT to 4 pounds of 50% wettable powder per 100 gallons of water. If only a few small trees are involved the trunk and limbs may be painted with a DDT mixture prepared by adding 1 pound 50% wettable DDT per 5 gallons of water.

Sprays should be applied when adult beetles are active, usually in late April and May and again in early September.

Spider Mites

The several species of spider mites are considered to be among the more serious orchard pests. They feed by sucking up plant juices and contribute to a devitalized condition of the trees and premature leaf drop. Some species overwinter as eggs on the trees, others as adults in crevices of the bark or under the debris on the ground.

Dormant sprays of oil or oil-lime sulfur are helpful in controlling mites. Sulfur sprays or dusts used in plant disease control also aid in red spider mite control. Neither the dormant spray nor the sulfur applications can always be depended on for full season control. Spider mites can be controlled with summer sprays of parathion, 1 pound 25% wettable powder; or malathion 2 pounds 25% wettable powder; or Kelthane 1 1/2 pounds 18 1/2% wettable powder; or Trithion 1 pound 25% wettable powder; or Diazinon 1 pound 25% wettable powder per 100 gallons of water. Do not apply parathion within 14 days; malathion within 3 days on cherries and prunes, 7 days on peaches and apricots; Kelthane within 7 days on cherries and prunes, 14 days on peaches and apricots; Diazinon within 10 days on cherries, prunes and apricots and 20 days on peaches; or Trithion within 30 days of harvest.

In some parts of the state malathion and parathion are no longer effective against spider mites. If you are in doubt concerning the effectiveness of these materials in your area, check with your county agricultural agent.

Thrifty trees, growing under conditions of adequate moisture, are less seriously damaged by mites than trees that are dry and in poor condition.

Syneta Leaf Beetle

This insect occurs in April and May on foliage, fruit clusters, and in open blossoms as a creamy-white beetle about one-fourth inch long. It eats holes in the leaves and blossom petals and gnaws out small cavities in fruit stems. The syneta beetle is especially injurious to cherries. One application of a 5% DDT dust, or a spray containing 2 pounds of 50% wettable DDT powder to 100 gallons of water, usually gives satisfactory control. Spray or dust applications should be repeated if followed by heavy rains. Dusts should be applied at the rate of not less than 45 pounds per acre.

Western Spotted Cucumber Beetle

This insect has become a serious pest of peaches in western Oregon. Irregular-shaped pits are eaten in the green and ripening fruit. Damaged fruit usually rots, causing complete loss. A sulfur dust containing 5% methoxychlor will control this insect. Parathion as suggested for control of oriental fruit moth is effective against the western spotted cucumber beetle. A Sevin spray, 2 pounds of 50% wettable powder per 100 gallons of water, is also effective and may be applied within 1 day of harvest. Do not apply methoxychlor within 21 days of harvest or parathion within 14 days of harvest.

Spray Program for Cherries

Time of application	Insect or disease	Spray material and strength
1. (a) Dormant. (October and January)	Dead bud (Bacterial canker)	Puratized Agricultural Spray, 1 pt. per 100 gals. of water 3/or Bordeaux 12-12-100. See page 10.
(b) Dormant spray. (Before buds open and before eggs hatch.)	Black cherry aphid. Effective against black cherry aphid but less effective than 1. (c) against scale and mites.	1 1/2 qts. liquid DN, or 1 1/2 lbs. DN wettable powder; or 1 lb. DN wettable powder plus 3 gals. dormant oil emulsion, or 1 to 2 gallons Ethion-oil combination, per 100 gallons of water.
(c) Dormant spray. (As winter buds are about to open.)	San Jose and lecanium scale. European red mite and brown mite (but not common spider mite).	3 gals. lime sulfur plus 2% dormant oil (2 1/2 gals. 80% emulsion), or 3 gals. lime sulfur plus 1 1/2 gals. Volck Supreme oil spray, or 4% dormant oil (5 gals. 80% emulsion), or 2 gals. Volck Supreme oil spray per 100 gals. of water. Any of these sprays also aids in control of newly-hatched aphids.
2. Popcorn stage. 1/ (Blossom buds white, just before opening.)	2A. Brown rot blossom blight	Spray materials per 100 gals. of spray Captan 2 lbs. or Ferbam 1 1/2 lbs. or Kolo-100 3 1/2 lbs. or Maneb 2 lbs. or Phygon XL 1/2 lb. 2/ or Puratized Agricultural Spray 1 pt. 3/ or TAG 1/2 pt. 3/ or Ziram 1 1/2 lbs. Add a spreader to all sprays. Sulfur dust 50 lbs. per acre.
	2B. Syneta beetle	5% DDT dust; or DDT spray, 2 lbs. 50% wettable powder in 100 gals. water.
	2C. Aphids	Demeton 1 pt. emulsion concentrate containing 2 lbs. actual demeton per gal.; or 1 pt. nicotine sulfate plus a spreader; or 1 lb. 25% Diazinon wettable powder in 100 gals. of water.
	2D. Bud moth and aphids	1 lb. 25% wettable parathion or 2 lbs. 25% wettable malathion in 100 gals. of water; or 5% malathion dust at the rate of 50 lbs. per acre.
3. Full blossom stage	Brown rot blossom blight	Same as 2A.

1/ For a combined single spray, any of the fungicides under 2A may be used with the insecticides under 2B, 2C, and 2D, except do not combine Puratized Agricultural Spray or TAG with parathion, or malathion.

2/ Phygon XL causes a mild skin burn on some people. A glycerol base cream applied to the face, neck, and arms before spraying will prevent this burn. Do not use an oil or lanolin base cream.

3/ TAG and Puratized Agricultural Spray are poisonous (contain mercury) and should be handled with caution. These fungicides cause a mild skin burn on some people.

Spray Program for Cherries (continued)

Time of application	Insect or disease	Spray material and strength
4. Petal fall spray. (When most of the petals are falling.)	4A. Brown rot blossom blight	Same as in Number 2A.
	4B. Leaf spot	Spray materials per 100 gals. of spray Captan 2 lbs. or Cyprex 1/2 lb. (do not use on bearing sweet cherry trees) or Ferbam 1 1/2 lbs. or Phygon XL 1/2 lb. or Ziram 1 1/2 lbs. Add a spreader to all sprays. Sulfur dust 50 lbs. per acre.
	4C. Syneta beetle	Same as 2B.
	4D. Aphids	Demeton 1 pt. emulsion concentrate containing 2 lbs. actual demeton per gallon in 100 gals. of water.
5. Shuck fall spray. (As soon as shucks fall from fruit.)	Leaf spot	Same as in 4B.
6. Two weeks later spray. (Two weeks after shuck fall.)	Leaf spot	Same as in 4B.
7. Later sprays. (First spray for fruit fly when flies first emerge. This date variable from year to year and will be announced by Experiment Station and Extension Service.)	Brown rot on fruit	For 100 gals. of spray add 6 lbs. wettable sulfur; or 1 1/2 lbs. ferbam or ziram; plus spreader; or dust with 50 lbs. sulfur per acre. Do not apply ferbam or ziram within 7 days of harvest.
	Cherry fruit fly	See suggestions for dusts and sprays under Cherry Fruit Fly, page 13.
	Cherry slugs	Apply dust or spray when slugs appear. See page 15.
	Shot-hole borers	See suggestions for control under Shot-hole borers, page 18.
	Spider mites	See suggestions under Spider Mites, page 18.

Spray Program for Prunes and Plums

Time of application	Insect or disease	Spray material and strength
1. Dormant spray. (As winter buds are ready to open.)	Lecanium and San Jose scale and mite eggs	Use 4% dormant oil (5 gals. 80% emulsion), or 2 gals. Volck Supreme oil spray, or 3 gals. lime sulfur plus 2% dormant oil, or 3 gals. lime sulfur plus 1 1/2 gals. Volck Supreme Spray oil per 100 gals. water.

Spray Program for Prunes and Plums (continued)

Time of application	Insect or disease	Spray material and strength
2. Delayed dormant spray. (When 30 to 50% of buds show green tips.)	Pear thrips. If no thrips are present, delay spray to green tip application	1 pt. 25% DDT emulsion to water for 100 gals. spray, or 2 lbs. 50% DDT wettable powder to water for 100 gals. spray, or 5% DDT dust combined with sulfur for dusting.
3. Green tip spray. (Most of buds green at tips.)		
4. Preblossom spray. (Buds white just before opening.)	Peach twig borer, bud moth	Basic lead arsenate, 3 lbs.; or DDT, 2 lbs. 50% wettable powder to 100 gals. of water. If bud moth present, add 1 lb. 25% wettable parathion or 2 lbs. 25% wettable malathion per 100 gals. of spray. See under Bud Moth. If Syneta beetle present, use DDT. See under Syneta Beetle.
	Aphids	If aphids present, add 1 pt. nicotine sulfate; or 1 lb. 25% wettable parathion to the spray.
5. First fruit spray or dust. (About 5 weeks before harvest.)	Leaf spot and brown rot	Use 6 lbs. wettable sulfur to 100 gals. of spray; or 50 lbs. dusting sulfur per acre.
6. Later sprays or dusts.	Leaf spot and brown rot	Use dust or spray as in 5. Repeat weekly up to harvest.
	Peach and prune root borer	8 lbs. 50% wettable DDT in 100 gals. of spray. Apply about July 15 and repeat in 3 to 4 weeks if infestation severe. See page 17.
	Shot-hole borers	See suggestions for control under Shot-hole Borers, page 18.
	Spider mites	See suggestions under Spider Mites, page 18.

Spray Program for Peaches

Time of application	Insect or disease	Spray material and strength
1. Dormant spray.	Lecanium scale	Use 4% dormant oil spray (5 gals. 80% emulsion), or 2 gals. Volck Supreme oil spray per 100 gals. of water.
2. Leaf curl spray. (Apply 1st spray in mid-December and the 2nd spray in mid-January before the buds swell.)	Peach leaf curl 1/	Bordeaux mixture 12-12-100, or Puratized Agricultural Spray, 3 pts., or TAG, 1 1/2 pts. 2/ or lime-sulfur 8 gals. in 100 gals. of water. A sticker should be added with each material. Cover every bud.
3. Popcorn stage spray. (Just before petals begin to open.)	3A. Brown rot blossom blight 3/	Spray materials per 100 gals. of spray Captan 2 lbs. or Ferbam 1 1/2 lbs. or Kolo-100 3 1/2 lbs. or Maneb 2 lbs. or Phygon XL 1/2 lb. 4/ or Puratized Agricultural Spray 1 pt. 2/ or TAG 1/2 pt. 2/ or Ziram 1 1/2 lbs. Add a spreader to all sprays. Sulfur dust 50 lbs. per acre.

Time of application	Insect or disease	Spray material and strength
3. Popcorn stage spray (continued). (Just before petals begin to open.)	3B. Bud moth, aphids 3/	3 lbs. basic lead arsenate plus spreader in water to make 100 gals. spray. If aphids present, add 1 pt. nicotine sulfate or 2 lbs. 25% wettable Diazinon, or 2 lbs. 25% wettable malathion to the spray; or 1 lb. 25% wettable parathion to make 100 gals. spray will control both bud moth and aphids.
4. Open blossom spray.	Brown rot blossom blight	Same as in 3A.
5. Petal fall spray. (When petals are falling.)	Peach twig borer, oriental fruit moth, aphids	2 lbs. 50% wettable DDT per 100 gals. spray. If aphids present add 1/2 lb. 25% parathion per 100 gals. spray.
	Brown rot blossom blight	Same as in 3A.
6. First fruit spray. (As soon as shucks fall.)	Coryneum peach blight and mildew	Use 6 lbs. wettable sulfur in 100 gals. of spray, or dusting sulfur at rate of 50 lbs. per acre.
7. Summer sprays or dusts. (First about 5 weeks before harvest or earlier if disease appears; repeat at weekly intervals; last application just before harvest.)	Brown rot, mildew, mites, western spotted cucumber beetle	Same as in 6. If western spotted cucumber beetle is a problem, use a sulfur dust containing 5% methoxychlor or a spray containing 2 lbs. 50% wettable Sevin per 100 gals. spray. For mites only, 1 lb. 25% wettable parathion to make 100 gals. spray. Do not use parathion within 10 days of harvest.
	Peach and prune root borer	8 lbs. 50% wettable DDT in 100 gals. of spray. Apply about July 15 and repeat in 3 to 4 weeks if infestation severe. See page 17.
	Shot-hole borers	See suggestions for control under shot-hole borers, page 18.
	Spider mites	See suggestions under Spider Mites, page 18.
8. Fall spray. (As leaves are dropping but before fall rains begin.)	Coryneum peach blight	Bordeaux 8-8-100. 5/

1/ Bordeaux mixture may be combined with dormant oil for both peach leaf curl and lecanium scale control. No sticker is needed with this combination.

2/ TAG and Puratized Agricultural Spray are poisonous (contain mercury) and should be handled with caution. These fungicides cause a mild skin burn on some people.

3/ For a combined single spray, any of the fungicides under 3A may be used with DDT and the insecticides under 3B, except DO NOT mix Puratized Agricultural Spray or TAG with parathion or malathion.

4/ Phygon XL causes a mild skin burn on some people. A glycerol base cream applied to the face, neck, and arms before spraying will prevent this burn. Do not use an oil or lanolin base cream.

5/ Bordeaux 12-12-100 means a Bordeaux mixture of 12 pounds of copper sulfate plus 12 pounds of lime in 100 gallons of spray. (Bordeaux 8-8-100 means 8 pounds of copper sulfate plus 8 pounds of lime in 100 gallons of spray.) In any Bordeaux formula, the ingredients are always given in the same order with the pounds of copper sulfate first, then the pounds of lime, and the gallons of water last.

To prepare lime for Bordeaux mixture

1. Lime (hydrated or slaked) -- Soak in water for 2 hours before putting in spray tank. This is important.

2. Quick lime (unslaked) -- Slake in water carefully for several days before putting in tank.

Procedure in adding Bordeaux materials to spray tank

1. Copper Sulfate -- Fill tank two-thirds full. Then wash copper sulfate slowly through screen with agitator going.

2. Lime -- Using a hose, wash slowly through screen after all the copper sulfate is in the tank. The lime must be as dilute as possible before meeting the copper sulfate in the tank. Continue agitation until the spray is applied.

Spray Program for Apricots

Time of application	Insect or disease	Spray material and strength
1. Dormant spray	Scale insects, mite eggs	Use 4% dormant oil spray (5 gals. 80% emulsion), or 2 gals. Volck Supreme oil spray per 100 gals. water.
2. Popcorn stage	Brown rot blossom blight	Puratized Agricultural Spray, 1 pt. in 100 gals. of water; or Phygon XL, 1/2 lb. in 100 gals. of water; or ferbam or ziram, 1 1/2 lbs. in 100 gals. of water.
3. Full blossom stage	Brown rot blossom blight	Same as 2 above.
4. Petal-fall spray. (When most of the petals are falling)	Brown rot blossom blight	Same as 2 above.
5. Petal fall spray	Twig borer	3 lbs. basic lead arsenate or cryolite; or 2 lbs. 50% DDT wettable powder in 100 gals water.
6. First fruit spray (As soon as shucks fall)	Coryneum blight	Ziram, 1 1/2 lbs. per 100 gals. plus spreader.
7. Later sprays	Brown rot on fruit	1 1/2 lbs. ziram per 100 gals. or ziram dust. (Do not use ziram past the early cover sprays.)
	Shot-hole borer	See suggestions for control under Shot-hole Borers, page 18.
8. Early fall spray	Coryneum blight	Bordeaux 8-8-100. Cover every bud.

Sulfur has a detrimental effect on apricots, and therefore is not recommended at any time.

5M-2-61